

PRELIMINARY 1:500,000-SCALE GEOLOGIC MAPPING OF CLARITAS FOSSAE, MARS

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The Claritas Fossae system is a complex, linear fracture zone that extends from its northern intersection with Noctis Labyrinthus 1800 km south-southeast to its southern intersection with Thaumasia Fossae. The width of the fracture zone varies from 150 km in the north to 550 km in the south; topographic relief, based on radar data from Earth, is 1.0-1.5 km (Roth and others, 1980). Claritas Fossae and its co-incident ridge or rise have been interpreted to be a horst with more than 8 km of vertical uplift; the greatest such uplift on Mars (Masursky and others, 1978).

Interest in the Claritas Fossae system derives from:

1. The relationship between Claritas Fossae and other major tectonic systems with which it is associated, Noctis Labyrinthus and Thaumasia Fossae.
2. The role played by Claritas Fossae in the geologic evolution of the greater Tharsis Montes and Valles Marineris regions.
3. The possibility of the occurrence there of small volcanic centers in, or marginal to, the Claritas Fossae system.
4. The likely possibility of identifying there suitable sites for Mars landing(s), sample collection(s), and rover traverses.

Viking orbital images of sufficiently high resolution exist to provide the basis only for two 1:500,000-scale photomosaic base maps of Claritas Fossae. They extend en echelon east and west, i.e. the southeast corner of the northern and western quadrangle (MTM-30102) is coincident with the northwest corner of the eastern and southern quadrangle (MTM-25107). Preliminary geologic maps of the two quadrangles have been prepared.

Materials in the quadrangles are Noachian and Hesperian age (Scott and Tanaka, 1986), and the quadrangles are characterized by the widespread occurrence of fractured and cratered plateau material, the oldest material in the map areas. Younger smooth plains material covers the floors of craters of varied size and is widespread along the western margin of the western quadrangle. Intermediate in age are plains material, cratered plains material, fractured plains material and cratered plateau material.

Craters mostly are flat-floored and range up to 50 km in diameter. Three relative ages of crater materials have been mapped.

The structural grain is dominated by north-south fractures, and most of those occur in the fractured and cratered plateau material. Both quadrangles have a few east-west fractures; the relative ages of the two dominant fracture sets are not everywhere the same.

The apparent surface smoothness and the diversity of materials over much of the area of the two quadrangles would provide appealing sites for landing, sample collection, and traversing were it not for the problem of air-breaking at the relatively high altitude, 7-9 km above the Mars datum, of the Claritas Fossae system.

REFERENCES:

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